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(54) Title: **STEM CELL LIBRARIES**

(57) Abstract: A stem cell library is created by genetically modifying stem cells with nucleic acids encoding polypeptides which can promote stem cell differentiation into specific cell types. Alternatively, the stem cell library is exposed to an externally added factor that promotes stem cell differentiation into a desired cell line, e.g., neuronal or muscle. The library is used to determine the effect of the encoded protein on the differentiation process. The library is also used to produce nucleic acids for insertion into embryonic stem cells to produce transfected embryonic stem cells. The nucleic acids are inserted into a locus that permits widespread expression of the encoded polypeptide in animals produced from blastocysts that incorporate the transfected cells. Non-human chimeric animals produced by combining blastocysts derived from animal models of human disease and embryonic stem cells transfected with molecules from the library provide an *in vivo* system for therapeutic design.



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